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# User Experiences with Group-Based Access Control in a Mobile Photo-Sharing Application

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**Abstract.** In this paper, we report on users' experiences with a mobile photo-sharing application, which operates a granular access control mechanism for sharing with social network contacts. We describe results from survey and interview data following participants' use of the mobile application, during a 2-month field study. We discuss implications of our findings relating to consideration of sharing decisions, contact recall, targeting content, granularity adjustment and automation/recommendation.

**Keywords:** Privacy, Access Control, Social Networking, Contact Management

## 1 Introduction

Many people now interact with social media services from their mobile phones, capturing and sharing content direct from their devices in many different locations and situations, amid diverse people and surroundings. Users often consider the context of an interaction as part of their sharing decisions [4], since contextual information can be revealed by shared content and carry implications for users' privacy. In addition, users often account for their varying relationships with numerous potential recipients [3]. Specifying precise privacy preferences can be challenging, especially on limited interfaces, such as mobile devices. Consequently, sharing mechanisms are often subjected to a trade-off between the granularity of control and effort/usability. In this paper we describe users' experiences with an access control mechanism (ACM) for a mobile photo-sharing application, which aims to offer fine-grained control by dividing users' social network contacts into a manageable list of sets, whilst affording adequate usability. We discuss users' experiences with the granular access control mechanism, which may be useful to those making research and design decisions concerning mobile privacy management.

## 2 Field Study Background

22 participants took part in our field study, using a mobile photo-sharing application for 2 months. The application allowed users to specify whether particular collections of their social network contacts would be given access to each photograph. Before

the study began, participants divided their social network contacts (from Facebook) into a number of sub-sets, directed by asking them to list network divisions based on commonly considered grouping criteria from [1]; social circles and cliques, tie strength divisions, organisational boundaries, geographical boundaries, temporal episodes and functional roles. The resultant sub-sets were unique to each individual participant, e.g. one participant created the sets "My quiz team", "My current work colleagues", "London Friends", "Best friends", "People I barely know" and "Business contacts", among others. Lists of network sub-sets were then imported into the mobile application for each participant, where they acted as folders to which photos could be uploaded, and for which contacts associated with each sub-set/folder would be granted access. For each photograph, users were presented with the list of their sub-sets of contacts and could decide which to share the photograph with, based on content and current context, by scrolling through the list<sup>1</sup>. On average, participants divided their networks into 18 sub-sets. Over 1000 photos were captured and shared during the study. A detailed quantitative analysis of sharing behaviors and the effects of contextual dynamics on sharing decisions within this study can be found in [2]. Here, however, we focus on qualitative feedback about participants' experiences with their use of the ACM.

### 3 Findings and Design Implications

One of the prevalent experiences reported by participants during their use of the ACM was that it encouraged them to question the value of particular content to specific sub-sets of contacts, more often than they were typically used to. Users expressed that they frequently asked themselves questions with respect to sharing implications, such as; would it affect their judgement of me, do they *need* to see it, are they likely to interact with me as a result of sharing this? Most participants reported that these considerations were not common when sharing uniformly with all contacts in other systems (e.g. all "Friends" in Facebook), as considerations relating to specific contacts were often masked under a veil of commonality by more coarse-grained mechanisms.

The list of network sub-sets provided a condensed representation of each user's social network, which supported recall with respect to which contacts were present within the network. When contrasted with other sharing mechanisms that users had experienced, users stated that differences in granularity affected their ability to account for certain contacts when considering sharing decisions; *"It's easy to forget precisely who you're sharing with when your entire social network is treated as a single entity, or as too many individual contacts to look over"*. Another participant echoed the sentiment; *"Breaking my network down into sets of contacts made this more manageable"*. One user reported that limitations of mobile interfaces for viewing large amounts of information had previously contributed to the problem of contact recall. A combination of automated filtering and her own manual filtering of incoming "feed" content meant that the presence of some contacts was concealed; *"I*

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<sup>1</sup> The application interface can be viewed at: <http://www.greenvolcanosoftware.com/flickit.html>

*access Facebook mainly through my mobile. Some people are blocked from my feed because it was becoming too overloaded. If I don't see them when I'm receiving (content), I tend to forget they're there when I'm sharing. This (ACM) reminded me they were there without naming them all individually".*

Several of our participants discussed the potential for ~~targeting~~ content to contacts for which it would be most relevant, and in fact most reported that even when privacy was not a major concern for a particular photo, they had selected only the sets of contacts that they thought would be most interested in seeing the content. Many felt that granting access to content based on relevance could lead to a system in which the content being received was generally of higher *value*, however they also expressed concerns that this may affect opportunities for serendipity and divest users of content that is unexpectedly of value to them.

Several users raised concerns that the ACM itself may introduce neglect towards weaker ties. Many participants reported that over time they found themselves naturally favouring selection of close friends and strong ties as there were often fewer privacy implications associated with doing so. Some users felt that by being presented with a choice to restrict each piece of content, they sometimes acted in an overly cautious manner, even when it was not entirely necessary, and that this behaviour may result in some contacts being shared with very rarely. This finding suggests that fine-grained control is not *always* necessary and that a suitable ACM should provide the appropriate granularity for the current situation. It may be useful for systems in which access control becomes nuanced and complex to provide some visualisation or representation of what has been shared and with whom, such that users can easily maintain a balance between sufficient levels of privacy and interaction with their entire network.

Our interviews revealed that certain contextual factors at the time of capture were likely to have an effect on sharing decisions; for example many users reported that artistic photos or photos of places and scenery would often be shared with everyone and that photos taken in public places such as bars and nightclubs, and with people featured in them were more restricted. Some participants cited "predictable patterns" emerging in their sharing behaviours, however, most noted that exceptions to these patterns did occasionally occur. For example, exceptional circumstances dictated that certain sets should/should not be shared with or that it was necessary to increase granularity even further, by removing particular individuals from with a set. Several of our participants reported that sometimes they struggled to make sharing decisions because of the number of elements to consider. These findings suggest that a sharing mechanism which is able to make reasonably accurate recommendations could operate by offering the user one or more possible sharing choices, perhaps with an explanation of each; and offering a way to modify the suggested sharing decision(s) before finalizing one. Furthermore, even if a mechanism fails to predict precisely which contacts to share with it may still offer some benefit by predicting an appropriate level of granularity at which to specify disclosure, based on contextual factors that can be automatically detected by the device at the time of capture. Participants stated that the sets created from the initial subdivision of their network

were not necessarily suited for *all* situations and that configuration of sets may need to be more dynamic than our application allowed.

Just under half of the participants mentioned that the ACM was time consuming to use, although most valued the extra control it provided. *“It was certainly useful, but it was a bit of an effort to allocate ‘Sets’ for every single photo”*. This highlights that it is not only important to find an appropriate granularity at which to collate contacts, but that it may also be useful to collate content similarly, such that privacy preferences for collections of photographs can be specified in a single action. Metadata from photographs and contextual information captured by the mobile device may be useful in collating content to which similar privacy preferences apply and automating aspects of mobile privacy control to reduce the burden on the user.

## 4 Conclusion

In summary, we have studied users’ experiences with a granular access control mechanism, which incorporates the ability for users to share with particular sub-sets of their social network based on considerations regarding a particular piece of content and its associated context. Although social network users will benefit from the ability to easily specify control over how their content is shared we have outlined some areas in which the design of the access control mechanism can affect users’ experiences with a content sharing application. Designers need to be aware of the implications that a particular mechanism might have for their system, for example the effect it may have on the frequency of privacy considerations, users’ ability to recall contacts, opportunities for serendipity, neglect of weaker ties and effort required to accurately configure and adjust contact sets. Our future work will examine the use of predictive content sharing tools and explore the opportunity to assist users even further through automation and recommendation of sharing decisions.

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